US010752322B2

(12) **United States Patent**
Greer et al.

(10) **Patent No.: US 10,752,322 B2**
(45) **Date of Patent: Aug. 25, 2020**

(54) **RECREATIONAL CANOPY WITH PEDAL DRIVEN GENERATOR**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/375,361**

(22) Filed: **Apr. 4, 2019**

(65) **Prior Publication Data**

US 2019/0283843 A1 Sep. 19, 2019

Related U.S. Application Data

(63) Continuation-in-part of application No. 15/924,201, filed on Mar. 17, 2018, now Pat. No. 10,252,778.

(51) **Int. Cl.**
B63B 17/02 (2006.01)
B63H 16/20 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***B63B 17/02*** (2013.01); ***B63B 71/00*** (2020.01); ***B63H 16/20*** (2013.01); ***B63J 99/00*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC B63B 17/02; B63B 71/00; H02K 7/1861; H02S 20/30; H02S 30/20; H02S 40/34;
(Continued)

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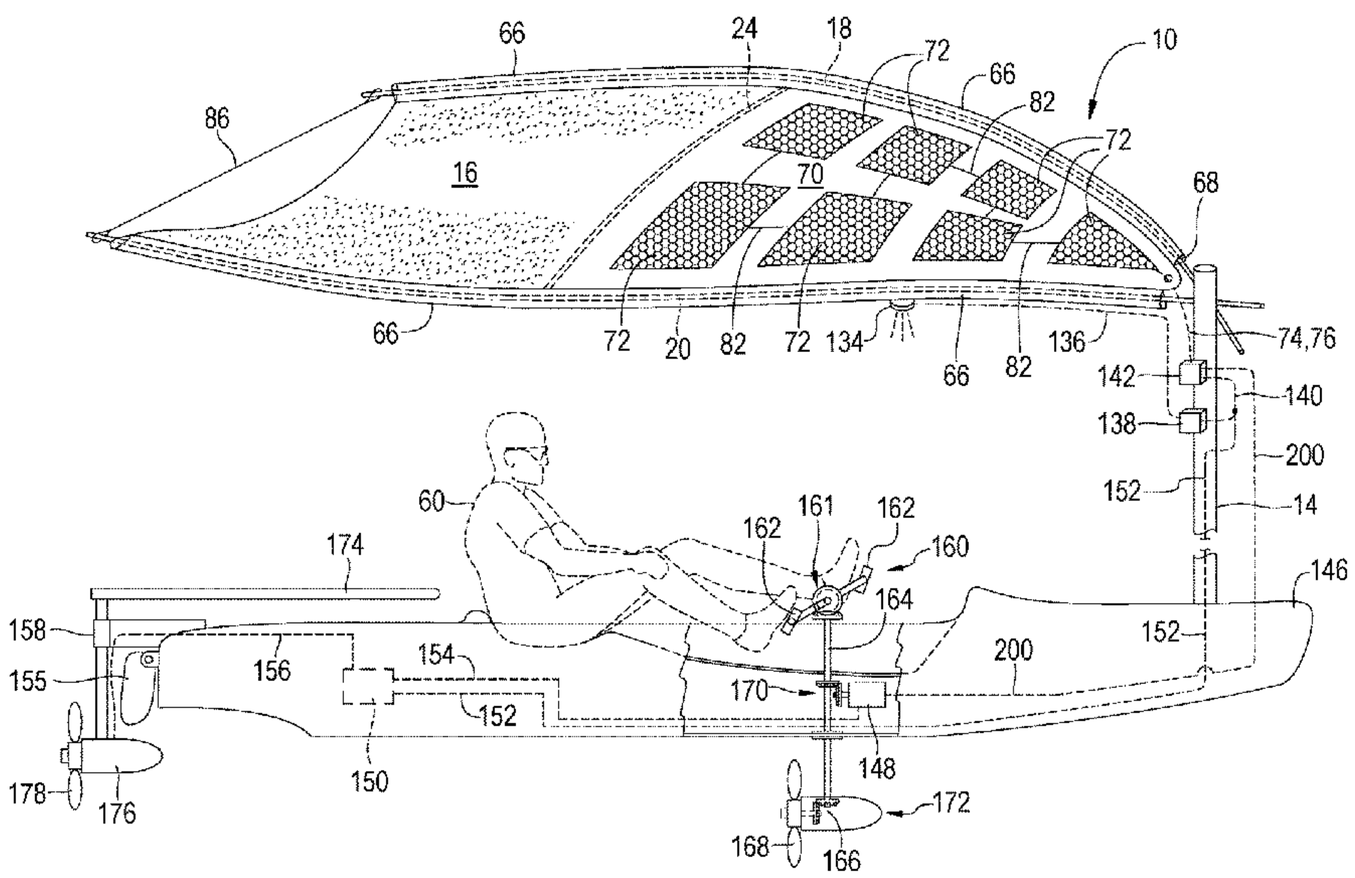
(57) **ABSTRACT**

Method and apparatus for an improved recreational canopy which may be used with watercraft wherein the canopy is constructed by using a pair of flexible, resilient rod-like members wherein one end of each of the flexible rods is inserted through mating apertures in an upright support member mounted onto the watercraft, or other structure, so that the rods are bowed outwardly and frictionally held in the stanchion. A canopy, which may incorporate solar cell fabric, is attached between the rods so that the canopy generally appears to be in an elongated V-shaped structure which stretches across a portion of the supporting structure, such as a watercraft, between the flexible rods. The upper end of the upright support member may be pivotable and the rod-like members may be disposed in a cap removably disposed on the upper end of the upright support member. A lighting system including an alternative power source being provided on the canopy. Also, a user driven pedal system for providing propulsion to a kayak watercraft is shown which includes a generator driven by the pedal system for providing additional electrical energy for use on the watercraft and for propelling a kayak by either a propeller or flappers.

11 Claims, 6 Drawing Sheets



(51) **Int. Cl.**

F21S 9/04	(2006.01)
B63J 99/00	(2009.01)
H02S 30/20	(2014.01)
H02K 7/18	(2006.01)
B63B 71/00	(2020.01)
E04H 15/48	(2006.01)
B60J 11/04	(2006.01)
A47B 37/04	(2006.01)
A47C 7/66	(2006.01)
A47C 7/72	(2006.01)
H02S 20/30	(2014.01)
F21V 33/00	(2006.01)
F21S 9/03	(2006.01)
H02J 7/35	(2006.01)
H02S 40/34	(2014.01)

(52) **U.S. Cl.**

CPC ***H02K 7/1861*** (2013.01); ***H02S 30/20*** (2014.12); *A47B 37/04* (2013.01); *A47C 7/66* (2013.01); *A47C 7/725* (2013.01); *B60J 11/04* (2013.01); *B63H 2016/202* (2013.01); *E04H 15/48* (2013.01); *F21S 9/035* (2013.01); *F21S 9/04* (2013.01); *F21V 33/006* (2013.01); *H02J 7/35* (2013.01); *H02S 20/30* (2014.12); *H02S 40/34* (2014.12)

(58) **Field of Classification Search**

CPC B63J 99/00; H02J 7/35; F21V 33/006; A47C 7/725; A47C 7/66; B60J 11/04; B63H 2016/202; B63H 16/20; E04H 15/48; F21S 9/04; F21S 9/035

USPC 440/12.62, 12.65, 26, 30, 31; 114/361

See application file for complete search history.

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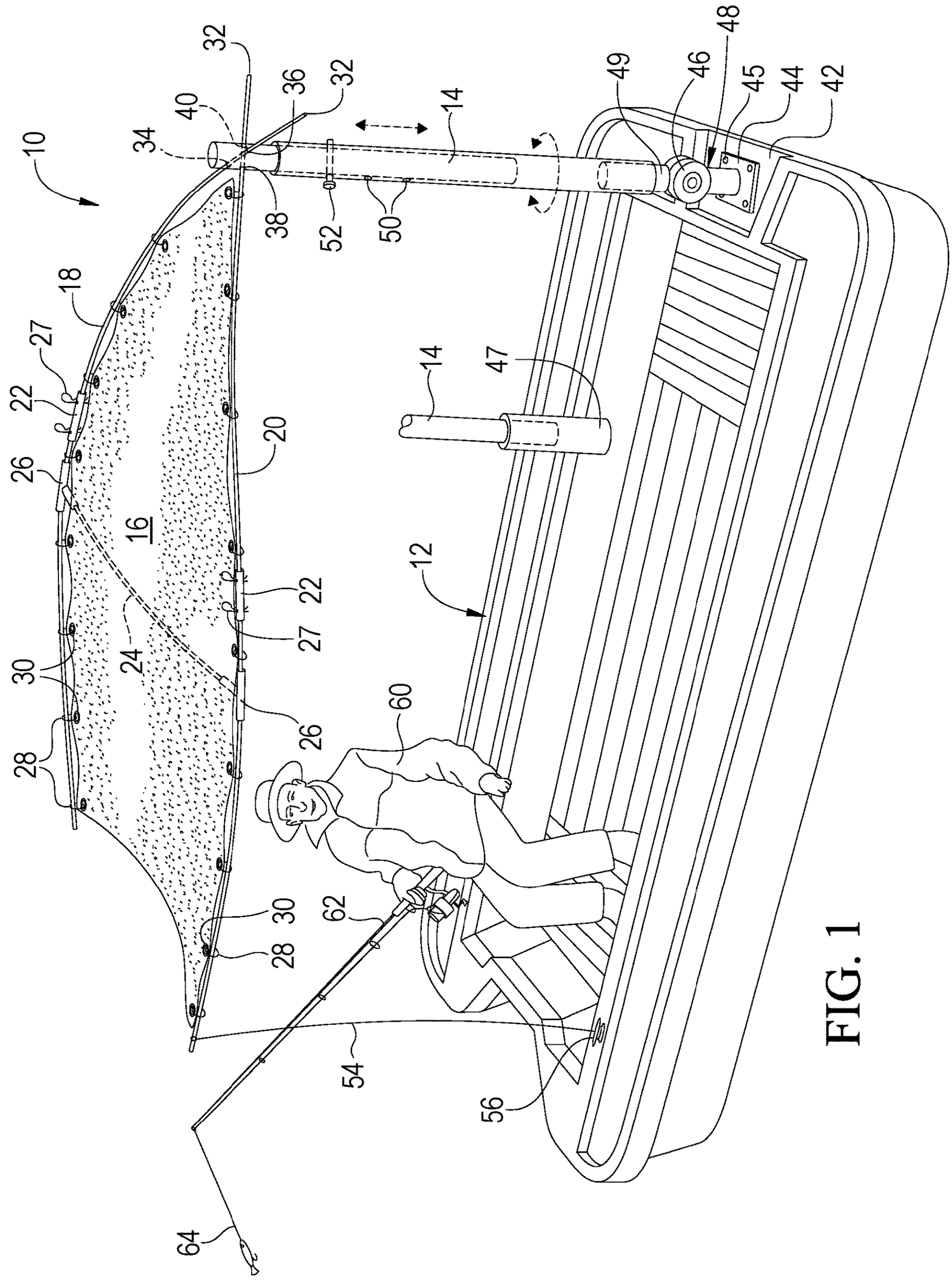
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FIG. 1

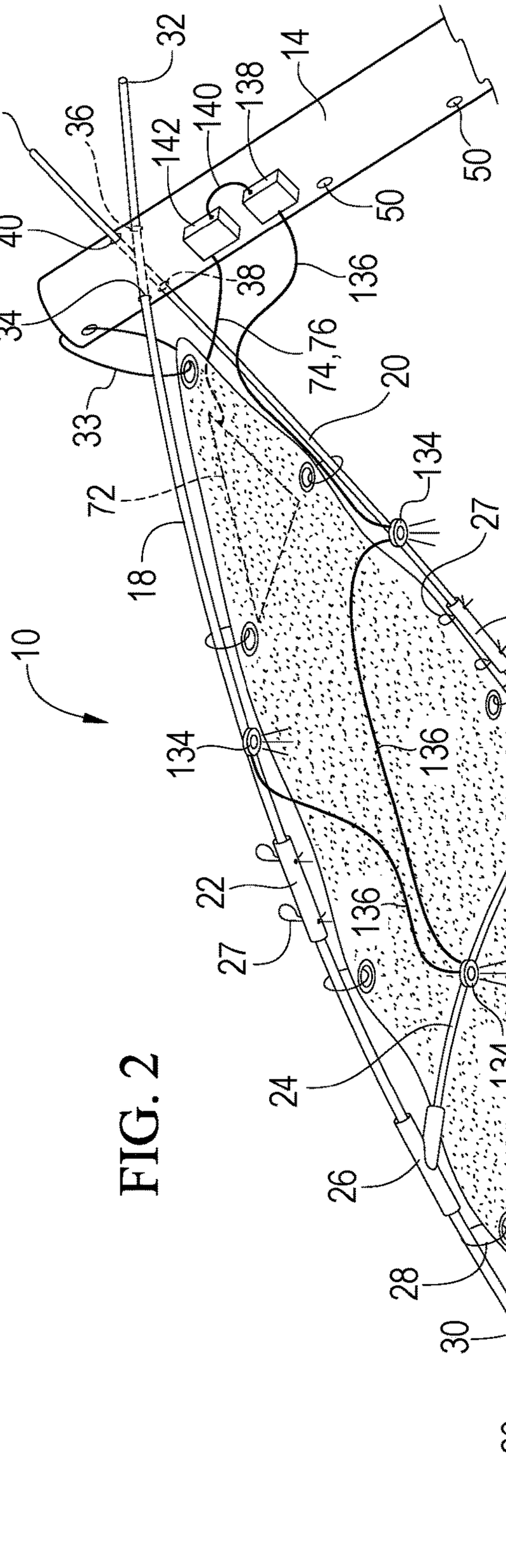

FIG. 2

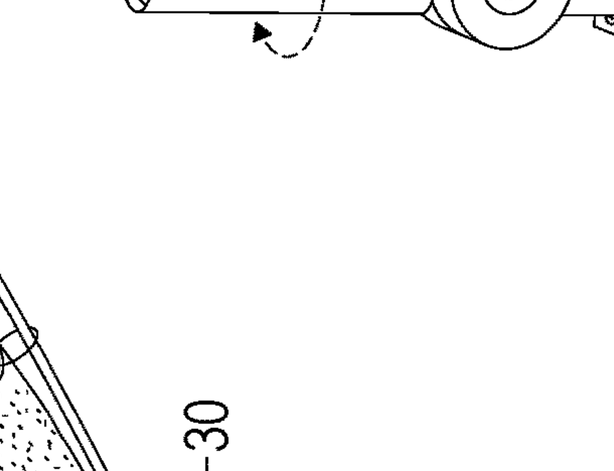

FIG. 4

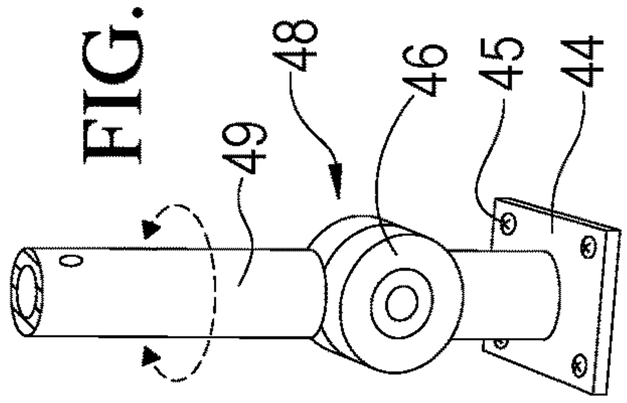

FIG. 3

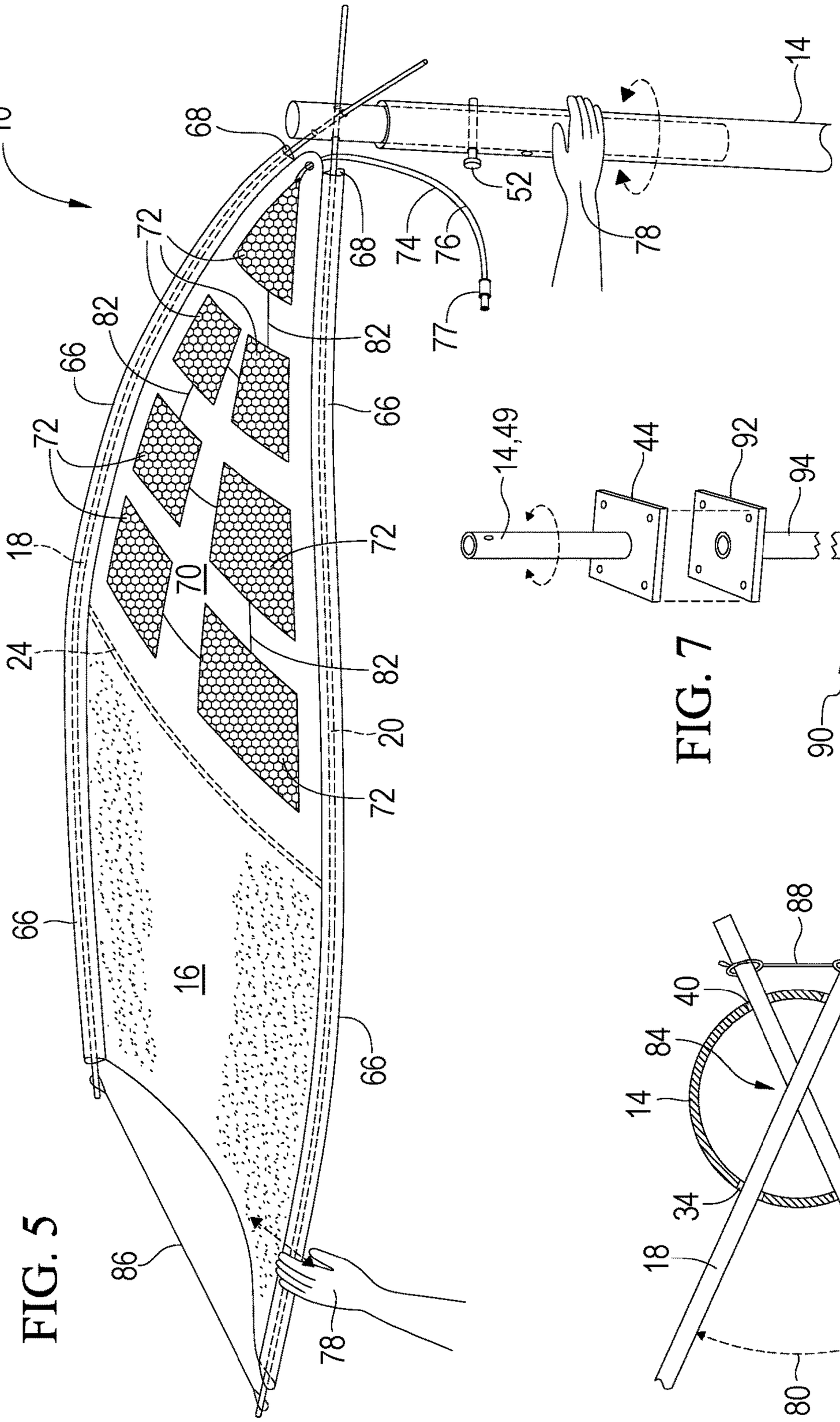

FIG. 5

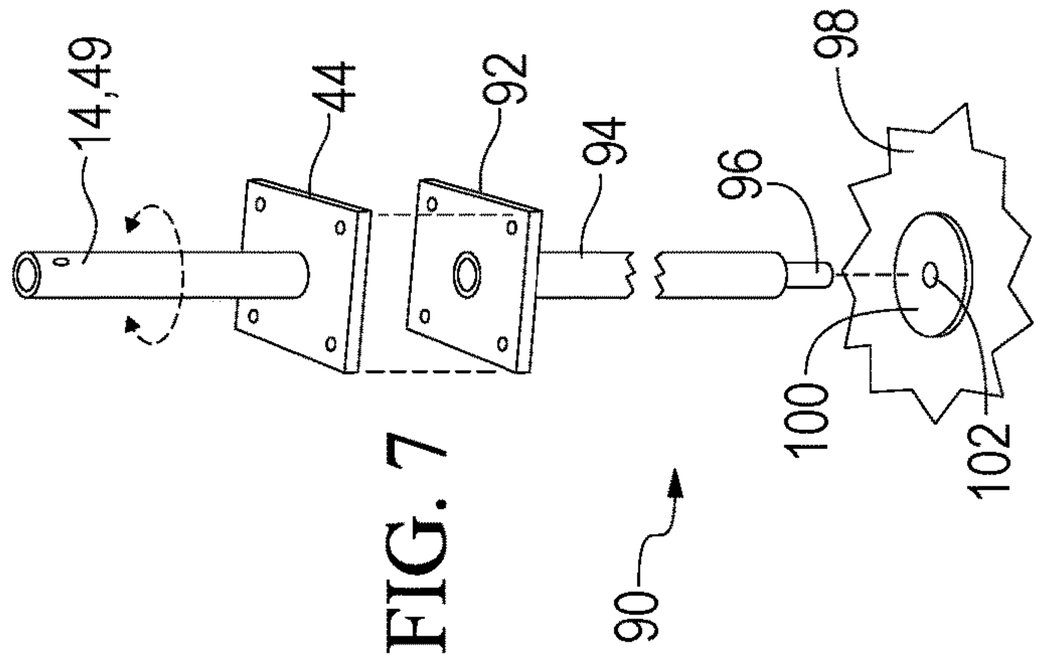

FIG. 7

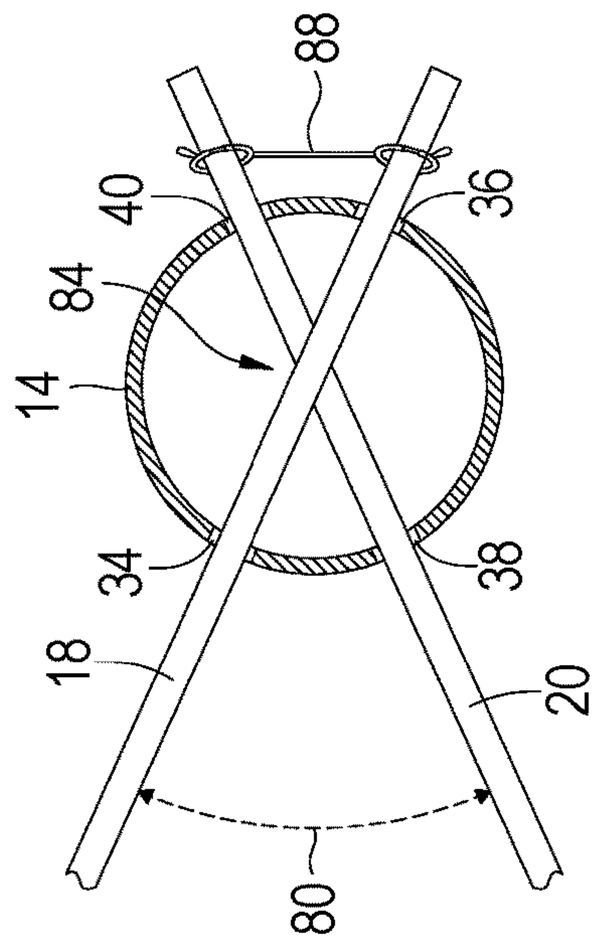

FIG. 6

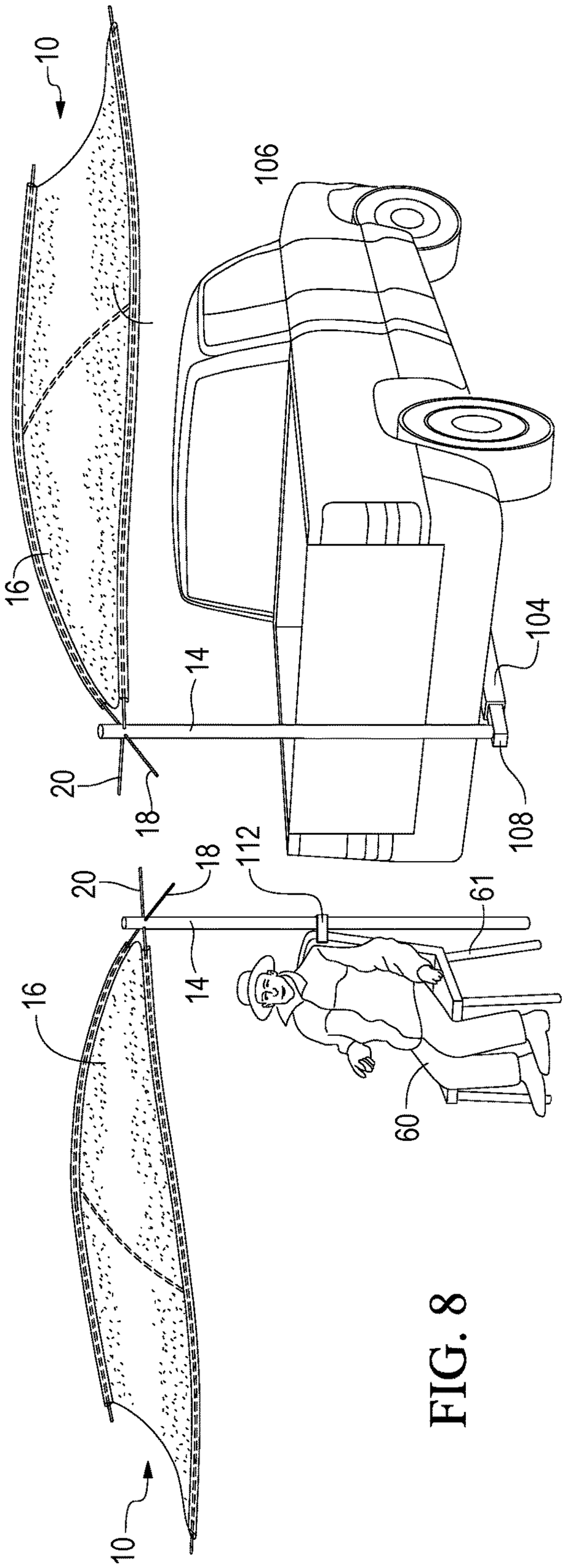

FIG. 8

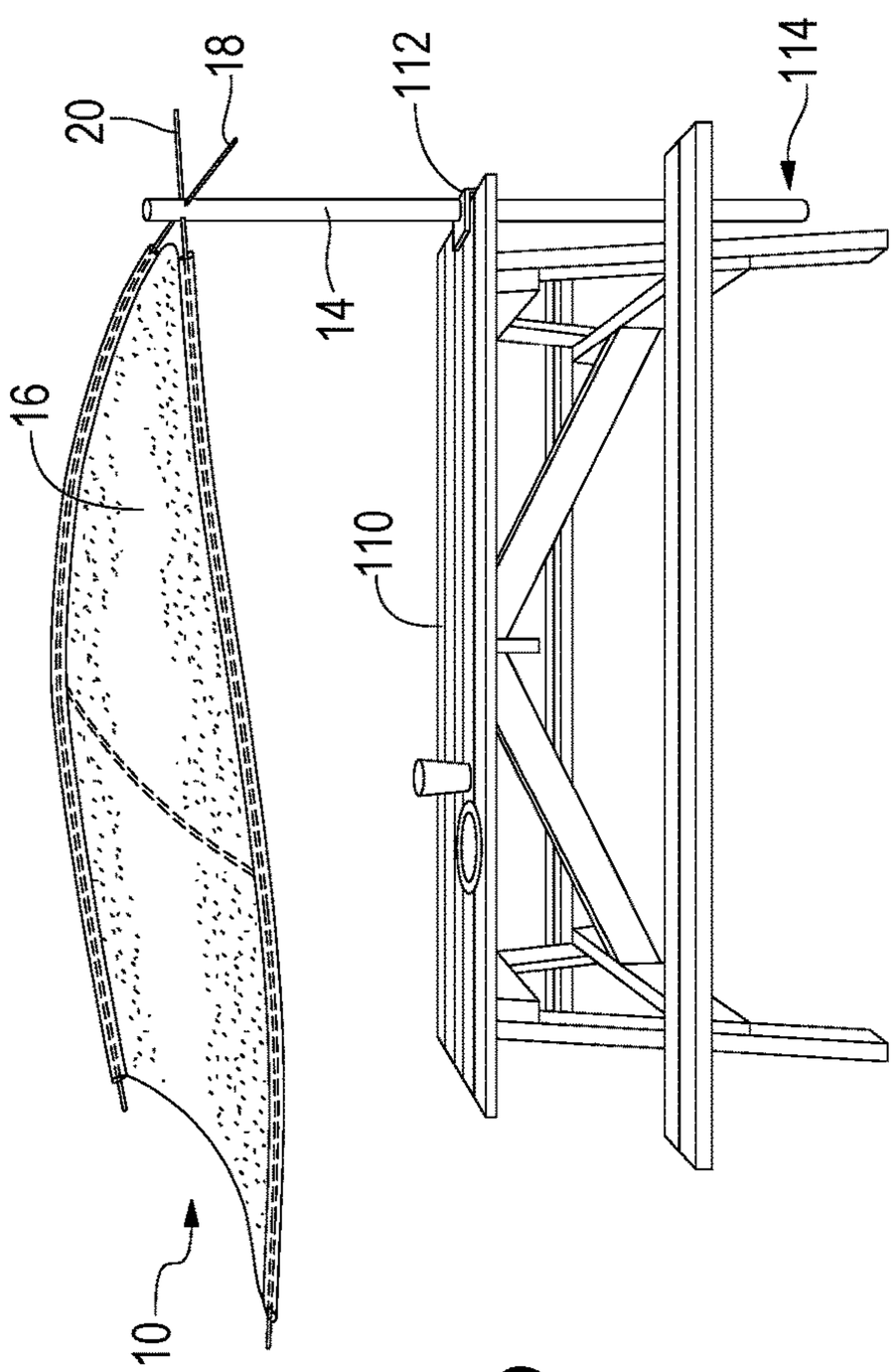

FIG. 9

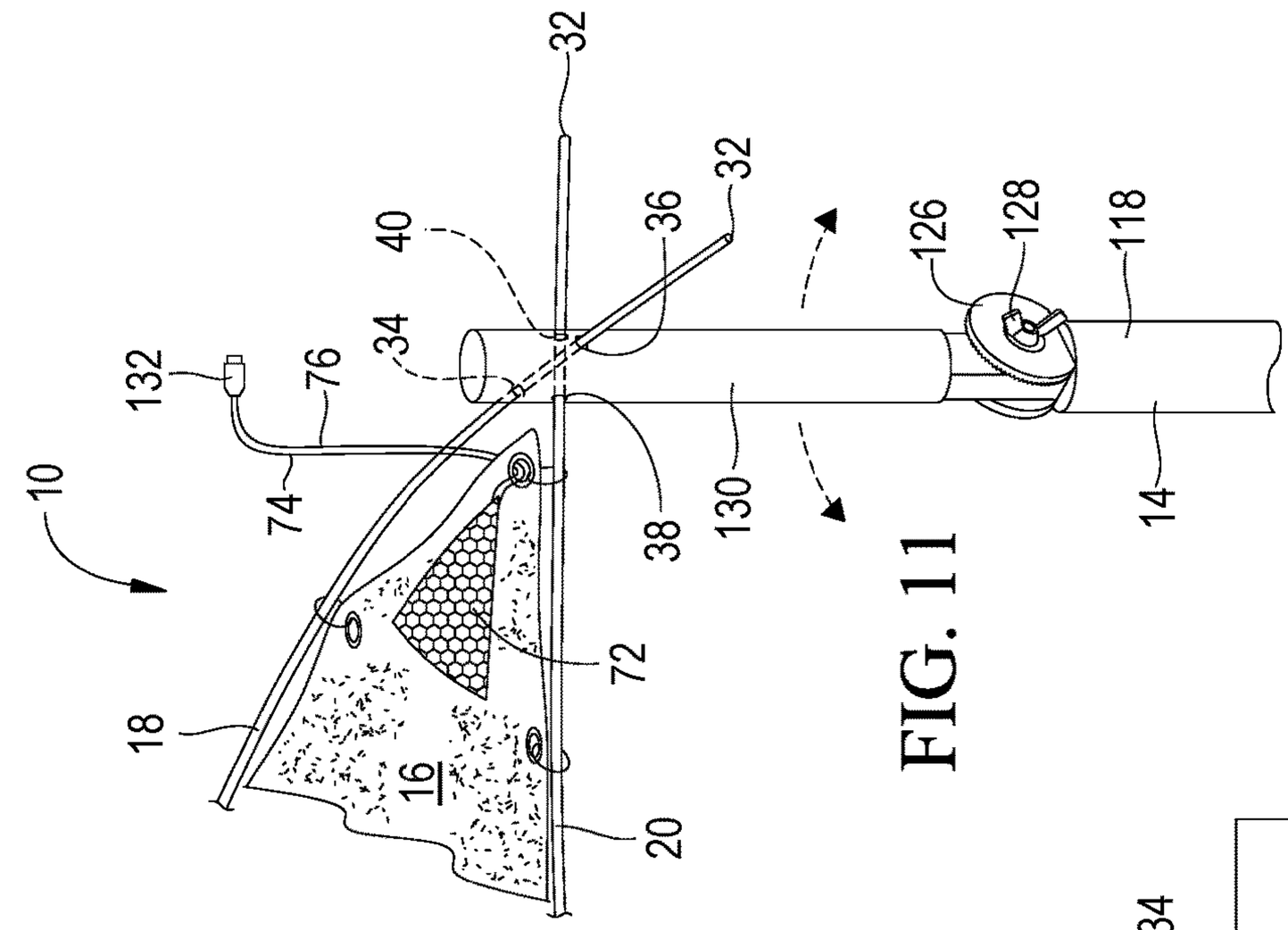

FIG. 11

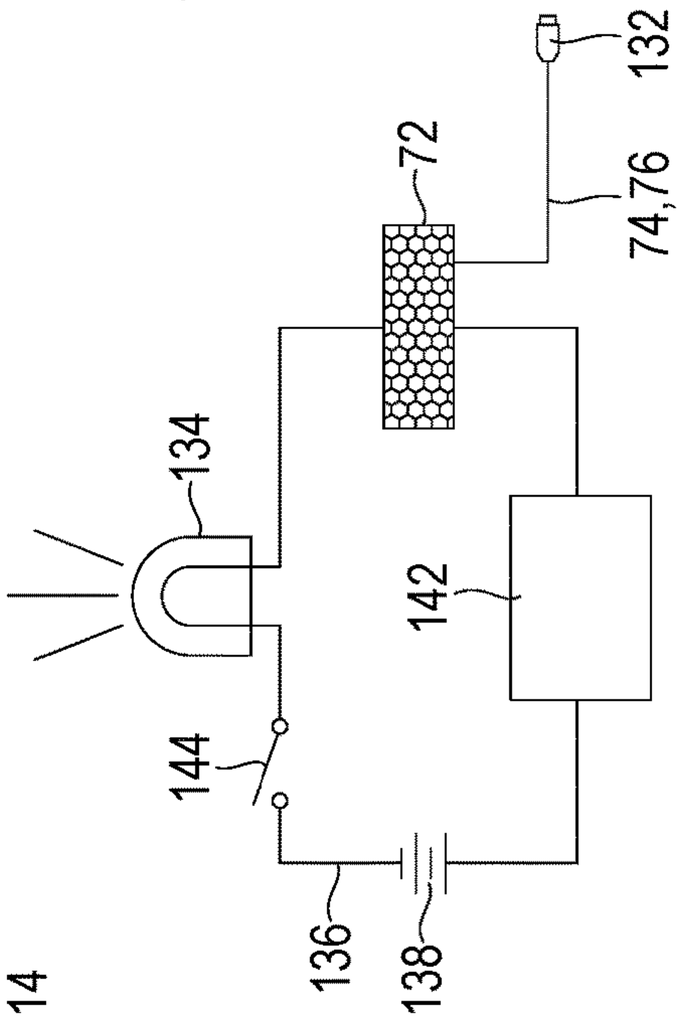

FIG. 12

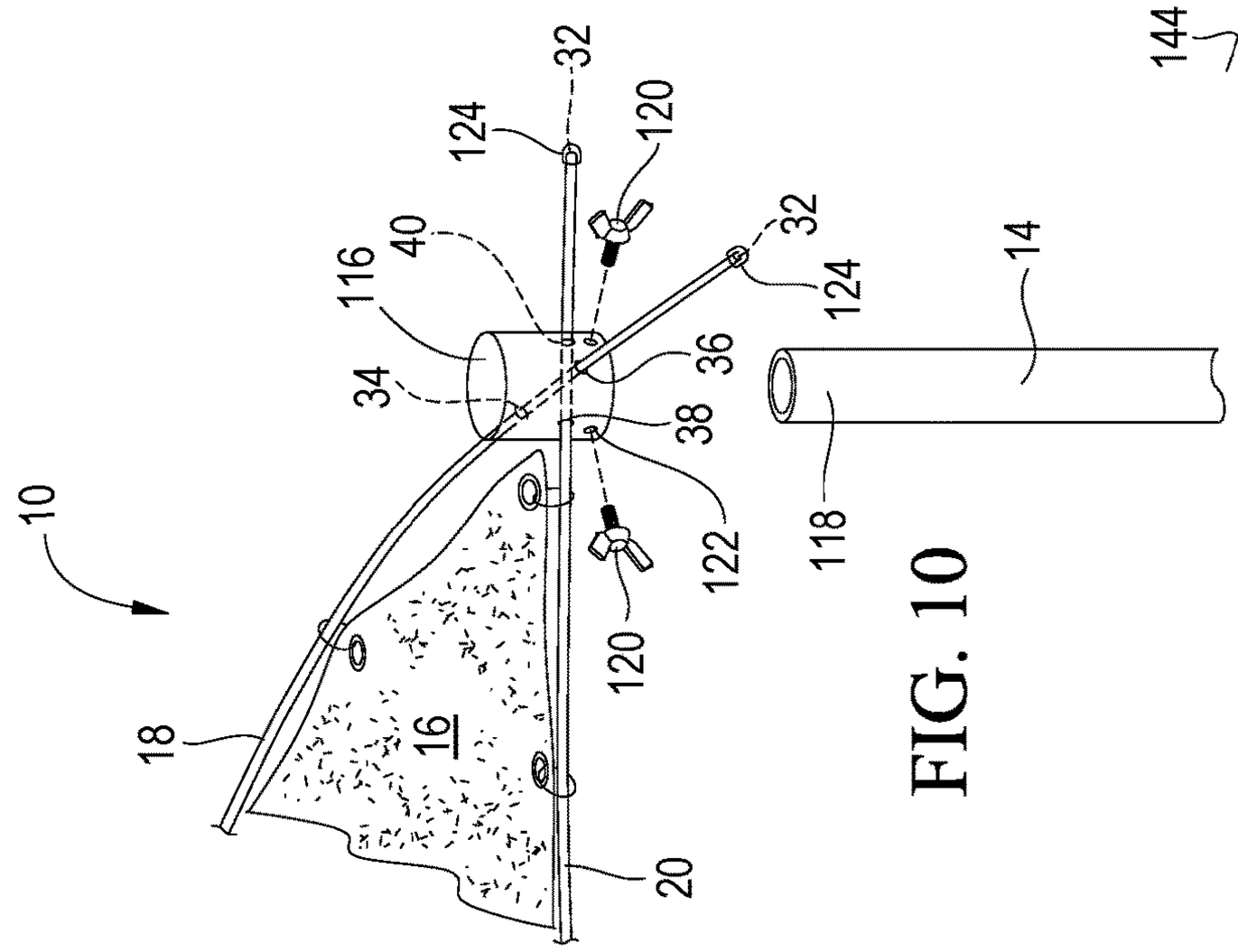

FIG. 10

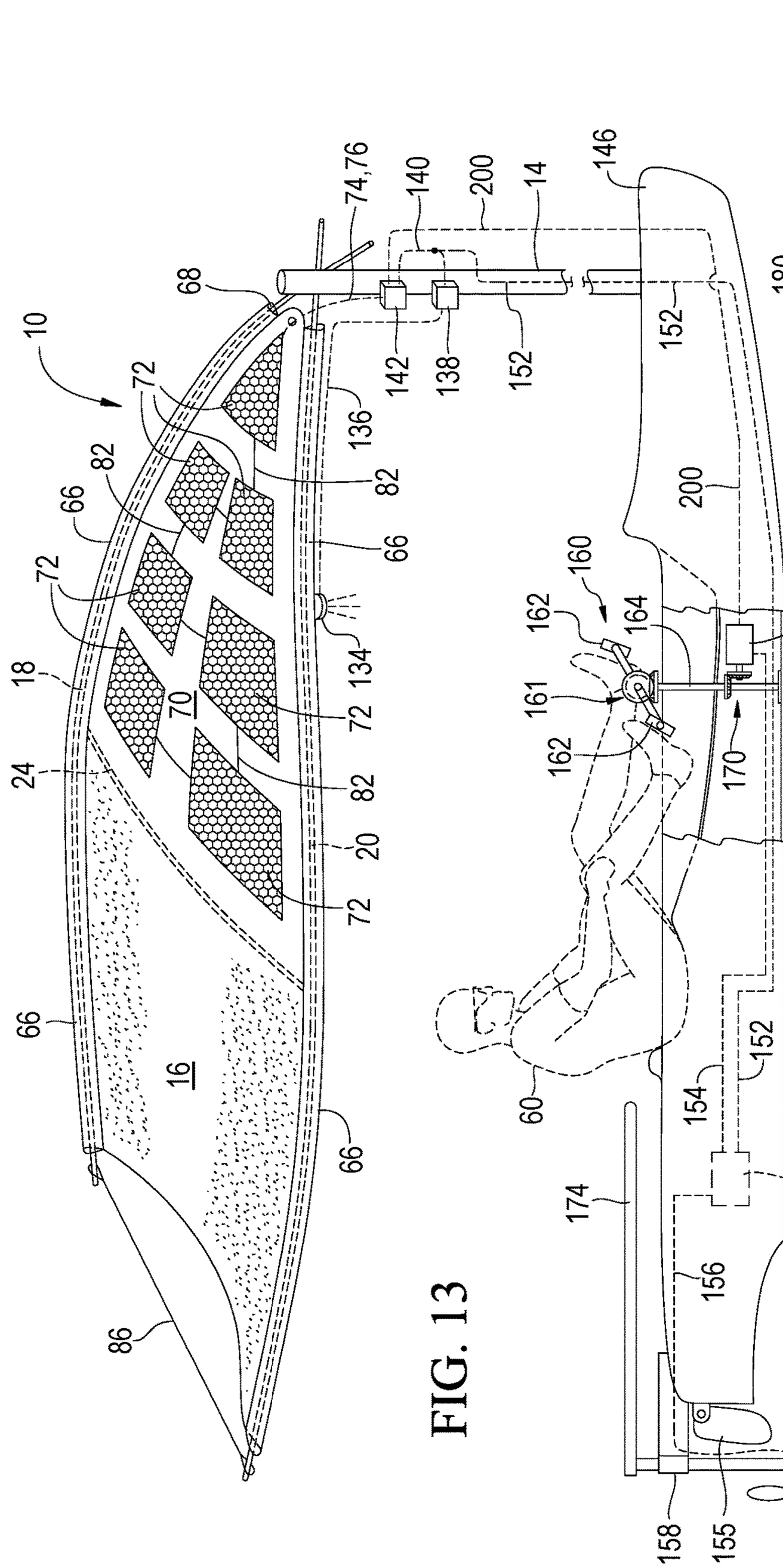
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FIG. 13

RECREATIONAL CANOPY WITH PEDAL DRIVEN GENERATOR

RELATED APPLICATIONS

This application is a Continuation-in-Part of U.S. patent application Ser. No. 15/924,201 filed on Mar. 17, 2018.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates generally to canopies and, more particularly, is concerned with an improved canopy for recreational use on a watercraft, however, the canopy could be mounted on other separate structures, e.g., a chair or in the ground.

Description of the Related Art

Devices relevant to the present invention have been described in the related art, however, none of the related art devices disclose the unique features of the present invention.

While these devices may be suitable for the purposes for which they were designed, they would not be as suitable for the purposes of the present invention as hereinafter described. As will be shown by way of explanation and that the present invention works in a novel manner and differently from the related art.

SUMMARY OF THE PRESENT INVENTION

The present invention discloses a canopy for recreational use on a watercraft wherein the canopy is constructed by using a pair of flexible, fiberglass rod-like members wherein one end of each of the flexible members is inserted through mating apertures in an upright member or stanchion mounted onto the watercraft so that the rod-like members are bowed outwardly and frictionally held in the stanchion. The canopy may be attached between the rod members by using rings or similar devices placed through eyelets in the canopy so that the canopy generally appears to be in an elongated, somewhat V-shaped structure which stretches across a portion of the watercraft between the flexible members. The canopy may also be disposed on the rod members by inserted the rods through sleeves disposed on the edges of the canopy. The canopy is rotatable around the stanchion and the height of the canopy can be adjusted up and down using apertures or the like in the stanchion. Also shown is a cross member running between the flexible rod members so as to provide support underneath the canopy near the middle of the flexible rods. The canopy may be entirely or partially constructed of solar cell fabric for furnishing electrical energy to power electrical devices including a lighting system mounted on the canopy which may also obtain electrical energy from an alternative power source which may be rechargeable. Additionally, there is shown a line attached to a rear end of the canopy so that a hand of a user can grasp the line or the canopy directly and rotate the canopy around the upright member or stanchion so that the canopy can be positioned in a favorable position suitable to the user and so that the user can freely cast a rod and reel from underneath the canopy of the present invention without hitting the canopy support. The upper end of the stanchion may be pivotable and the rod-like members may be disposed in a cap removably disposed on the upper end of the stanchion. Also, a user driven pedal system for

providing propulsion to a kayak watercraft is shown which includes a generator driven by the pedal system for providing additional electrical energy for use on the watercraft and for propelling a kayak by either a propeller or flappers.

An object of the present invention is to provide a recreational canopy for various uses such as for use on a watercraft. A further object of the present invention is to provide a recreational canopy which can be easily assembled and disassembled and which can be packaged and sold as a kit. A further object of the present invention is to provide a canopy on a watercraft which can be easily adjusted by a user. A further object of the present invention is to provide a canopy on a watercraft which allows a user to cast a rod and reel from underneath the canopy without hitting a canopy support. A further object of the present invention is to provide a canopy for a watercraft which can be raised and lowered and rotated about an upright member used to mount the canopy on the watercraft. A further object of the present invention is to provide a recreational canopy which can be supported by several different type structures and which incorporates photovoltaic cells for furnishing electrical energy for various electrical devices including a lighting system mounted on the canopy. A further object of the present invention is to provide a canopy for a watercraft which can be easily operated by a user. A further object of the present is to provide a canopy for a watercraft which can be relatively inexpensively manufactured.

The foregoing and other objects and advantages will appear from the description to follow. In the description reference is made to the accompanying drawings, which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. These embodiments will be described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that structural changes may be made without departing from the scope of the invention. In the accompanying drawings, like reference characters designate the same or similar parts throughout the several views.

The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is best defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be more fully understood, it will now be described, by way of example, with reference to the accompanying drawings in which:

FIG. **1** is a perspective view of the present invention shown in operative connection.

FIG. **2** is an enlarged perspective view of portions of the present invention.

FIG. **3** is a perspective view of an exemplary mounting bracket for the present invention.

FIG. **4** is an elevation view of an exemplary structure for mounting of the present invention.

FIG. **5** is a perspective view of portions of the present invention.

FIG. **6** is a plan view of portions of the present invention.

FIG. **7** is an exploded perspective view of a typical marine mount for the present invention.

FIG. **8** is a perspective view of an exemplary structure for mounting of the present invention.

FIG. **9** is a perspective view of an exemplary structure for mounting of the present invention.

FIG. **10** is a perspective view of portions of the present invention.

FIG. **11** is a perspective view of portions of the present invention.

FIG. **12** is an illustration of an exemplary electrical circuit and components for the present invention.

FIG. **13** is a perspective view of an alternative embodiment of the present invention shown in operative connection.

FIG. **14** is a perspective view of portions of an alternative embodiment of the present invention.

LIST OF REFERENCE NUMERALS

With regard to reference numerals used, the following numbering is used throughout the drawings,

10 present invention
12 watercraft
14 upright support
15 tip of upright support
16 canopy
18 first flexible rod
20 second flexible rod
22 ferrule
24 cross member
26 T connector
27 connector pin
28 ring
30 eyelet
32 end of rod
33 member
34 aperture
36 aperture
38 aperture
40 aperture
42 surface of watercraft
44 base
45 fastener
46 rotatable portion
47 rod holder
48 mount for upright support
49 pole mourning portion
50 aperture
52 pin
54 line
56 hardware or cleat
58 ground
60 fisherman/user
61 chair
62 rod and reel
64 lure and line
66 sleeve
68 hole for rod
70 solar cell fabric
72 photovoltaic cells
74 positive polarity electrical output
76 negative polarity electrical output
77 exemplary electrical connector/barrel connector
78 hand of user
80 angle
82 electrical interconnections
84 criss-cross
86 line
88 clip
90 pedestal mounting assembly
92 seat plate
94 shaft of pedestal

96 pin of pedestal
98 deck of watercraft
100 deck mounting plate
102 socket for pin or shaft
104 receiver tube of trailer hitch
106 vehicle
108 draw bar insert portion
110 table
112 clamp
114 lower end of upright support and ground
116 cap
118 upper end of upright support
120 fastener/wing nut
122 apertures
124 enlargements
126 pivoting member
128 fastener/wing nut
130 separate upper extension
132 USB
134 light
136 electrical wiring harness
138 battery
140 electrical connection
142 battery recharger
144 electrical switch
146 kayak
148 electrical generator
150 battery
152 electrical wiring harness
154 electrical wiring harness
156 electrical wiring harness
158 mounting system
160 pedal drive system
162 pedal
164 drive shaft
166 drive assembly and bevel gears
168 propeller
170 drive assembly and bevel gears
172 motor
174 tiller
176 electrical motor
178 propeller
180 pedal
182 pedal shaft
184 first flapper
186 second flapper
188 first drum
190 second drum
192 propulsion means
194 generator
196 coupling rod
198 driving wheel
200 electrical wiring harness

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The following discussion describes in detail at least one embodiment of the present invention. This discussion should not be construed, however, as limiting the present invention to the particular embodiments described herein since practitioners skilled in the art will recognize numerous other embodiments as well. For a definition of the complete scope of the invention the reader is directed to the appended claims. FIGS. **1** through **14** illustrate the present invention wherein a canopy for recreational use is disclosed and which is generally indicated by reference number **10**.

Turning to FIGS. **1** and **2**, therein is shown the present invention **10** showing a watercraft **12** to which is attached an upright support post or stanchion **14** having a canopy **16** disposed thereon. The canopy **16** is supported between a first and second **18**, **20** side frame members or rods which are flexible and resilient in nature similar to what a fiberglass or graphite composition rod would exhibit and the from tip of canopy **16** may be attached to upright support **14** using a piece of material or member **33**. Each rod **18**, **20** may be made of one piece or two pieces and a two piece unit would require a conventional ferrule or the like shown at **22** with connector pins **27** or the like in order to connect the pieces of the rod **18**, **20** to each other. Also, a cross member **24** is shown underneath the canopy **16** so as to provide vertical support for the canopy in order to keep it from ripping or tearing as would be caused by wind or movement of the boat or watercraft **12** and T-connectors **26** or the like are shown on each side for connecting an end of the cross bar **4** to each of the flexible rods **18**, **20**. The canopy **16** is connected to the rods **18**, **20** using a plurality of rings **28** passing through multiple eyelets **30** disposed near the edge of the canopy. An alternative embodiment for attaching the canopy **16** to rods **18**, **20** is shown in FIG. **5**. The flexible rods **18**, **20** are attached to an upper end of the upright support or stanchion **14** by having an end **32** of each rod pass through respective apertures **34**, **36**, **38**, **40** of the upright support **14**. An end of rod **18** extends or passes through aperture **34**, **36** and an end of rod **20** passes through aperture **38**, **40** as best shown in FIG. **2**. This very simple construction technique reduces the cost and time of manufacturing the present invention **10**. The ends of the rod **18**, **20** being under inherent resilience force are frictionally held firmly in the aperture pairs **34**, **36**, **38 40** as the ends **32** of the rods **18**, **20** pass completely through the mating opposing walls of the upright support **14**. Also shown is an up and down height adjustment mechanism for the upright member **14** wherein a plurality of apertures **50** are shown passing through the inner and outer upright support **14** so that the inner upright support is telescopically connected to the outer upright support using a plurality of apertures **50** having a pin **52** pass through a selected aperture pair as would be done in the standard manner by one skilled in the art so as to make the canopy **16** of the present invention **10** height adjustable in an up-down direction. Also shown is a line **54** which provides means to rotate the canopy **16**, connected to an end of canopy **16** and having an end tied to cleat **56** which line can be used to control and thereby to reposition, move or rotate the canopy **16** about the watercraft **12** to a user selected position. Also shown is a fisherman or user **60** in boat **12** holding a rod and reel **62** in his hand with a lure and line **64** thereon illustrating how a user can cast from underneath the canopy **16** so that the rod does not hit anything during the cast. An alternate mounting means for the upright support post **14** is shown by rod holder **47** disposed on an inside wall of the boat **12** with a lower end of the post **14** inserted in the rod holder so that the post is rotatable in the rod holder. Also shown is an exemplary mounting device **48** for connecting the upright support **14** to a surface **42** of the watercraft **12** or the like wherein the mounting device has a base **44** for receiving fasteners **45** extending into the surface **42** so as to be fixed in place and a middle portion **46** which is generally pivotable and/or rotatable and a pole mounting portion **49** to which the upright support **14** is connected. Generally, it is expected that the upright support **14** would be removably fixed in place on a supporting structure, such as a watercraft **12** or rod holder **47**, so that the upright support is disposed in

substantially the upright position although the upright support may be permanently mounted on the supporting structure.

Continuing with FIG. **2** also shown therein is a lighting system including a plurality of lights **134** disposed on canopy **16** in a spaced apart relationship about the canopy so as to provide light to users **60** disposed underneath the canopy during times of darkness or low light conditions. The lights **134** may be any suitable type light, e.g., incandescent, LED (light emitting diode), or the like and are electrically connected to each other by any suitable type, e.g., series or parallel, electrical wiring harness **136**. Lights **134** are powered by an alternative power source such as a single battery or a multiple battery pack **138** which may be a non-rechargeable or a rechargeable battery being connected by any suitable electrical connection **140** to a battery recharger **142**, if needed, all of which components receive electrical energy from the photovoltaic cells **72** or the like which would be expected to be mounted on the top side of the canopy **16** so as to produce electrical energy for conduction through electrical output wires **74**, **76** which are discussed in more detail relative to FIG. **5**.

Turning to FIG. **3**, therein is shown an enlarged exemplary mounting device **48** for connecting the lower end of upright support **14** to a surface **42** of the watercraft **12** or the like wherein the mounting device has a base **44** for receiving fasteners **45** and a middle portion **46** which is generally pivotable and/or rotatable and a pole mounting portion **49** to which the upright support **14** is connected. Many different types of mounting devices **48** could be used with upright support **14** for connection to many types of separate structures such as chairs or the like.

Turning to FIG. **4**, therein is shown an enlarged view showing the lower end of the upright support **14** having a tip **15** thereon for insertion into a different support structure such as the ground **58** as would occur with sand at a beach.

Turning to FIG. **5**, therein is shown an alternative embodiment of the present invention **10** showing the canopy **16** being extended or stretched between rods **18**, **20** wherein the rods are each inserted into conventional sleeves **66** disposed on and extending along first and second sides or edges of the sheet of material of the canopy. Each sleeves **66** has a hole or rodhole **68** therein through which the rod **18**, **20** is inserted into or removed from the sleeve and the sleeve extends substantially entirely along the edge of the canopy **16** from a front to rear end thereof. The rods **18**, **20** could be one piece or two piece for easier folding, and storage. Also shown on the canopy **11** is at least a portion of the sheet of material making up the canopy including solar cell fabric **70**, wherein as used in this specification, the solar cell fabric **70** includes photovoltaic cells **72** attached to a surface thereof, or embedded therein, or stitched into the fabric, or built into the layers around the fiber of the fabric, or otherwise included as a part of canopy **16**. The entire canopy **16** could be made of solar cell fabric **70** if so desired or the canopy could also be made so that part of the canopy has no solar cell fabric and part of the canopy has solar cell fabric. As used in this specification, photovoltaic cells are generally considered to be specialized electrical devices that convert visible light from the sun into some form of direct current electricity and are sometimes referred to as solar cells or solar panels. Also, some photovoltaic cells can convert infrared or ultraviolet radiation into direct current electricity. Direct current electrical output wires **74**, **76** from solar cell fabric **70** are also shown wherein **74** is a positive polarity output and **76** is a negative polarity output which could be approximately 12 volt however the operating current and

voltage would be determined by the load. Electrical energy output from all photovoltaic cells **72** of the solar cell fabric **70** would be connected to and thereby delivered to the direct current electrical output wires **74**, **76** as indicated by electrical interconnections **82**. The direct current output **74**, **76** could terminate in an exemplary electrical connector **77**, e.g., an inline DC (direct current) barrel power plug also called a barrel connector, as shown in FIG. **5**, and could be used, for all purposes, for example, providing power for a USB charger to recharge cell phones, all other wireless and wired communication devices, or watercraft **12** batteries. Wires **74**, **76** could be connected to all types of electrical connectors **77** including DC connectors and plugs, cylindrical and snap and lock connectors, all IEC connectors, cigar sockets and plugs, USB (universal serial bus) and HDMI connectors, pin plugs and many other types of connectors and plugs as commonly used by society and the marine industry and could be converted to AC (alternating current) current by using a converter so as to power all AC type electrical devices. Further, wires **74**, **76** could be connected at **77** to many types of electrical circuits for all purposes including powering all types of electrical devices including wireless or wired devices including radios, GPS and radar systems or storing electrical energy in batteries or related devices. In short, the electrical output from wires **74**, **76** could be used for any and all known purposes. Also shown is a hand **78** of a user to illustrate that a hand of a user can be used to provide means to rotate the canopy **16** and the upright support post **14** along with line **54**. Also, the rear ends of the flexible, fiberglass rods **18**, **20** may be squeezed inwardly toward each other and tied to each other for securement using line **86**. Other previously disclosed items are also shown.

Turning to FIG. **6**, therein is shown the top of the upright support post **14** showing the cross-crossed rods **18**, **20** and apertures **34-40** showing the angle **80** between the rods which is expected to be in the range of about 30 to 120 degrees with respect to each other. The size of the angle **80** depends on the diameter, stiffness and resilience of rods **18**, **20** wherein a larger diameter rod would require less stiffness and a smaller diameter rod would require greater stiffness to maintain the canopy in a stretched out disposition between the rods. Thus rods **18**, **20** need to be effectively sized so that the rods become bowed enough to provide an effective amount of lateral tension to support the canopy in a stretched out disposition. The cross-cross portion **84** of rods **18**, **20** is also shown. An optional clip **88** may be used to removably secure the front ends of rods **18**, **20** in apertures **36**, **40** so the rods cannot accidently become dislodged or disassembled wherein the clip has a first end removably attached to rod **18** and a second end removably attached to rod **20**. In order to disassemble the present invention **10**, the optional clip **88** would first be removed.

Turning to FIG. **7**, therein is shown an alternative exemplary mounting device (somewhat similar to mounting device **48** of FIG. **3**) using a conventional marine seat pedestal assembly **90** having a fixed or rotatable seat plate **92** on its upper end suitable for having a marine seat mounted thereon, pedestal shaft **94** and pin **96** on its lower end wherein the seat pedestal **90** is to be mounted into a receiving unit in the form of a receiving aperture or socket **102** centrally mounted in a flush mount deck or socket plate **100** which is, mounted on the deck **98** of a watercraft or the like. These type mounting devices are widely used in the marine industry, Upright support **14** could be connected directly to seat plate **92** or by using base **44** or to a pole mounting portion **49** as illustrated or the like. Many different types of similar mounting devices could be used to adapt upright support **14** for connection to many types of other separate structures including watercraft, chairs, tables or the like as mentioned elsewhere herein.

Turning to FIG. **8**, therein is shown an alternative exemplary mounting structure for the present invention **10** using a conventional vehicle **106**, e.g., a pickup truck as shown, wherein the upright support **14** is supported by a conventional receiver tube **104** of a trailer hitch using a draw bar insert portion **108** so that a user **60** can be shaded by canopy **16** of the present invention **10**. Also shown are rods **18**, **20** of the present invention **10**. The lower end of the upright support **14** would be adapted to be supported on the vehicle **106** and in this example would include adapting the lower end of upright support **14** to connect to the draw bar insert portion **108**. Also shown is an alternative exemplary mounting structure for the present invention **10** using a conventional chair **61** wherein the upright support **14** is supported by and attached to the chair by using a convention clamp **112** so that users could be shaded by the canopy **16** of the present invention **10**.

Turning to FIG. **9**, therein is shown an alternative exemplary mounting structure for the present invention **10** using a conventional table **110**, e.g., a picnic table as shown, wherein the upright support **14** is supported by the table by using a convention clamp **112** so that users could be shaded by the canopy **16** of the present invention **10**. Also shown are rods **18**, **20** of the present invention **10**. The upright support **14** would be adapted to be supported by the table **110** and in this example would include adapting the upright support **14** to connect to the table by using a clamp **112** or the like, or by having the lower end of the upright support be inserted into the ground as illustrated at **114** or by both.

Turning to FIG. **10**, therein is shown an alternative embodiment of the present invention **10** showing the canopy **16** being extended or stretched between rods **18**, **20** wherein the rods are each disposed on and extending along first and second sides or edges of the sheet of material of the canopy. The flexible rods **18**, **20** are attached to an upper end of the upright support or stanchion **14** by having an end **32** of each rod pass through respective apertures **34**, **36**, **38**, **40** provided in a removably secured end cap **116** on an upper end **118** of the upright support **14**. An end of rod **18** extends or passes through aperture **34**, **36** and an end of rod **20** passes through aperture **38**, **40** as best shown in FIG. **2**. Cap **116** is removably secured onto or over the upper end **118** of upright support **14** using a plurality fasteners **120**, e.g., wing nuts or the like, which fasteners extend through apertures **122** which apertures extend entirely through the cap so that an end of the fastener can contact the outer surface of the upright support **14** which fasteners allow the cap to be attached to and removed from the upright support **14**. This feature allows the cap **116** with canopy **16** disposed on rods **18**, **20** to be attached to any type of suitable upright support **14** even a pre-existing upright support **14**. Furthermore, the cap **116** with rods **18**, **20** and canopy **16** may be more easily removed from the upright support **14** to make it easier to disassemble the rods and canopy from the upright support. Also shown are optional enlargements **124** being disposed on the free ends of rods **18**, **20** which are used to removably secure the front ends of rods **18**, **20** in apertures **36**, **40** so the rods cannot accidently become dislodged or disassembled by pulling away from or through the apertures. In order to disassemble the. present invention **10**, the optional enlargement **124** would first be removed. Enlargement **124** may be attached to the ends of rods **18**, **20** in numerous ways such

as by being threaded on to the rods. Other previously disclosed items may also be shown.

Turning to FIG. **11**, therein is shown an alternative embodiment of the present invention **10** showing the canopy **16** being extended or stretched between rods **18**, **20** wherein the rods are attached to a separate upper extension member **130** which is attached to the upper end **118** of the upright support **14** by means of a pivoting member **126** mounted onto the upper end **118** of the upright support **14** which allows the angle between the rods **18**, **20** and upper extension **130** and the upright support **14** to be adjusted and which allows the rods **18**, **20** to be pointed downwardly or upwardly if desired by a user; also, the angle between the canopy **16** and the horizontal can be easily adjusted. The tension on the pivoting attachment member **126** is adjustable by using a fastener **128**, e.g., a wing nut or the like. An end of rod **18** extends or passes through aperture **34**, **36** and an end of rod **20** passes through aperture **38**, **40** as best shown in FIG. **2**. Also shown are photovoltaic cells **72** disposed on canopy **16**, as previously disclosed with respect to FIG. **5**, for generating electrical current along with the negative and positive electrical output wires **74**, **76** along with an electrical connector **132**, e.g., a USB as shown herein, which electrical connector **132** could be powered by photovoltaic cells **72** or a battery **138** (see FIG. **2**). Other previously disclosed items may also be shown.

Turning to FIG. **12**, therein is shown an illustration of an exemplary electrical circuit diagram or schematic for the present invention **10**, however, it is not represented that FIG. **12** discloses a circuit providing therein all of the possible functions disclosed in this application for the present invention **10**. One skilled in the art would realize that numerous circuit diagrams different from FIG. **12** could also be used with the present invention **10**. Shown in FIG. **12** are a lighting system including the light **134**, a power supply being photovoltaic cells **72** or the like, electrical wiring harness **136**, an alternative power source such as a battery **138** and battery recharger **142**, and a suitable electrical switch **144** for controlling the light **134** and related components of the electrical circuit including electrical connector **132** and electrical outputs **74**, **76**. Photovoltaic cells **72** could be switched to provide energy for electrical connector **132** or for recharging the battery **138** or for both. Furthermore, the battery **138** could be switched to provide energy for the lights **134**, the electrical connector **132** or both.

Turning to FIG. **13**, therein is shown an alternative embodiment of the present invention **10** in use with a kayak **146** illustrating a user **60** driven pedal system **160** for driving a propeller **168** propulsion system. The present invention **10** may provide a monohull watercraft comprising a kayak **146** or like watercraft having a cockpit containing a seat located such that a hip of a user **60** is partially below an upper deck of the kayak, the cockpit also containing a set of rotatable of pedals **162** arranged in a rotating fashion around a crank axis, the kayak propelled by a propeller **168** that is driven via a linkage by the set of rotatable pedals. Also shown is a downwardly extending drive shaft member **164** operatively linked through a mechanical assembly **161** to rotatable pedals **162** which may include bevel gears. A first gear box **170** wherein bevel gears are located and transmit power and rotation at a substantially perpendicular angle to a generator **148** driven by the rotatable pedals **162** which connects to a second lower gear box **166** of a motor **172** having a propeller **168** thereon which propels the kayak **146**. It would also be possible to drive the propeller **168** with many other type linkages, e.g., a flexible drive belt, such as a flat or round plastic belt or a chain, that transmits power from the pedals **162** to propeller **168**. Bevel gears are known in the art and need not be described in detail here. One skilled in the art would understand that rotation of pedals **162** by the legs of user **60** results in transmission of power and rotation to the propeller **168**. Electricity generated by generator **148** could be transmitted through electrical wiring harness **154** to a second battery **150** mounted in the kayak **146** or through electrical wiring harness **200** to the battery recharger **142**. Electricity from the storage battery **150** could be transmitted through electrical wiring harness **156** to stern mounted auxiliary electrical motor **176** attached with a conventional mounting system **158** to the stern end of the kayak **146**. Electrical motor **176** has propeller **178** mounted thereon for alternate propulsion of kayak **146** and which can be manually steered by the user **60** using tiller arm **174** in the conventional manner. Additionally, an optional rudder **155** is shown on the stern of the kayak **146**. Additionally, electricity may be transmitted through electrical wiring harness **152** to battery **150** from battery **138** which battery **138** and related components have been previously disclosed with respect to FIG. **2**. Energy from battery **150** can be used for many purposes, e.g., operating a cooler, radio, television, depth finder, cell phone, electric motor, lights and for many other uses as commonly done on watercraft. Other previously disclosed elements are also shown.

Turning to FIG. **14**, therein is shown another embodiment being a pedaled kayak **146** illustrating user **60** driven flappers **184**, **186** being a propulsion system propelled by the "penguin" like action of two transversely oscillating flexible flappers or sails **184**, **186** which is fully disclosed in U.S. Pat. No. 6,022,249. As the force on the pedals **162** is increased, the less restrained end of the flapper or sail twists **184**, **186** assume a propeller like shape. As the flappers or sails **184**, **186** oscillate, they change pitch or shape upon reaching the end of their arcuate movement as they simultaneously reverse direction of movement at the opposite ends of their arcuate pathway. This sail action is somewhat similar to what happens when tacking in a sailboat in that the sails exert, in both of their directions of movement, a forward thrust component. The kayak **146** has propulsion means extending below the water line including a pair of flappers **184**, **186** each adapted to oscillate through an arcuate path in a generally transverse direction with respect to the central longitudinal dimension of the watercraft **146**. Means are operatively associated with the propulsion means for applying input force to the propulsion means whereby as input force is applied the flexible flappers **184**, **186** can twist to form an angle of attack for providing forward thrust with respect to the longitudinal dimension of the watercraft **146** while moving in both directions along the arcuate path. The flappers **184**, **186** twist to form an angle of attack for providing forward thrust with respect to the longitudinal dimension of the watercraft **146** while moving in both directions along the arcuate path. Kayak **146** has a cockpit **12** which contains a set of pedals **162** adapted to be pushed, first one and then the other, by the user's 60 feet. The kayak **146** is also provided with a rudder **155** and tiller **174**. The pedals **162** are operatively connected by pedal shafts **182** to the flappers **184**, **186** through a mechanical assembly referred to as a propulsion means **192** which include rotatable drums **188** and **190** which carry radially extending rigid masts which project in a generally downwardly direction so that they always remain in the water and do not contact the underside of the hull so that the masts support the sails or flappers **184**, **186**, respectively, at their leading edges. Each of the flappers **184 186** are rotatable about its mast, so that the edge of the flapper opposite the leading edge can move

from one side to the other with respect to the longitudinal center line of drums **188** and **190**. This action results in both flappers **184**, **186** exerting of forward force or push on the watercraft **146** in both directions of transverse movement of the flappers, providing propulsion to the watercraft **146**. The generator **194** has a driving wheel **198** on its central shaft which is turned by the motion of the pedal shafts **182** by having a coupling rod **196** having its ends rotatably joined to the pedal shaft and the driving wheel as illustrated in FIG. **14**. Therefore, as the user **60** operates the pedals **180** the generator generates electricity which is transmitted to the battery **150** just as illustrated with respect to FIG. **14**. Other previously disclosed elements area also be shown.

Additional explanation of the presentation **10** is hereby provided with reference to all the figures wherein a light-weight canopy **16** for a boat **12** or other structure is disclosed which is fully adjustable up and down and rotatable in a 360 degree arc around the stanchion **14** using a line **54** which would allow a fisherman **60** underneath the canopy to cast while standing or sitting underneath the canopy. The canopy **16** also provides protection from sunrays and rain. The canopy **16** may be made of a sheet of any suitable flexible material such as canvas, or nylon-like material, for example polyethylene, and is supported by a pair of flexible, PVC, fiberglass or graphite rods **18**, **20** about ⅝ inch in diameter being hollow or solid and the canopy may be attached to the rods using eyelets **30** with simple connectors **28** being run through the eyelets Land around the rods. The inherent resilience of the rods **18**, **20** bias the flexible fiberglass rods away from each other providing an effective amount of tension for maintaining the canopy in a stretched out disposition between the rods wherein the rods are each bowed outwardly away from each other. Front ends **32** of the fiberglass rods **18**, **20** are each passed through holes **34-40** placed in opposite sides of an upright support PVC pipe or post **14** or like type support post or stanchion which support post is mounted onto a boat **12** or the like at its lower end. The canopy **16** would be easy to use and relatively inexpensive to manufacture. Also, the solid flexible, fiberglass rods **18**, **20** may be jointed at **22** so the system could be broken down and led for storage. Also, the rear ends of the flexible, fiberglass rods **18**, **20** may be squeezed inwardly toward each other and tied to each other for securement using line **86** while the boat **12** is being operated at high speed in a forward direction. Also, in addition to watercraft **12**, the canopy **16** could be mounted on many types of separate support structures such as picnic tables, trailers, pickup trucks, rear end of a vehicle, chairs, in the ground, a powered lift for hoisting workmen above the ground, or the like and there are many other applications for the present invention **10**. Canopy **16** may be made of canvas or tarp-like material and may be waterproof PVC post **14** may have an inner member about 1½ inch in diameter and an outer member about 2 inch in diameter. Ferrules **22** and T-connectors **26** could be made of fiberglass or aluminum or the like. In the event that the rear ends of rods **18**, **20** droop excessively downwardly due to the weight of the rods and canopy **16**, apertures **34**, **38** may be placed in upright support **14** so as to be slightly higher than apertures **36**, **40** so as to place the rods in a slight upward angle relative to the horizontal so that the weight of the rods and canopy pull the rods and canopy downwardly back to the horizontal; also the angle of the rods may be adjusted with the optional pivoting attachment member **126**.

A summary of the present invention **10** making reference to FIGS. **1-14** follows wherein a canopy **16** and upright support post **14** may be adapted or configured for being mounted on a separate structure such as a watercraft **12**, in the ground **58**, in a rod holder **47**, on a vehicle **106**, on a chair **61**, or on a table **110** and includes an upright support post **14** haying upper and lower ends; first and second flexible rods **18**, **20**, each flexible rod having first, front **32** and second, rear ends; a first end of each flexible rod extending through an upper end of said upright support post, wherein each flexible rod is held firmly in apertures adjacent the upper end of the upright support post, wherein the flexible rods are substantially horizontally disposed and extend outwardly and away from the upright support post at an angle to each other in the range of 30 to 120 degrees and terminating at the seconds ends. The lower end of post **14** may be supported fixed in place on a structure with the upper end being rotatable with respect to the lower end, wherein the flexible rods are substantially horizontally disposed; and, a sheet of material having a first edge removably disposed on and attached to the first flexible rod and a second edge removably disposed on and attached to the second flexible rod so that the sheet of material forms a canopy extending between the first and second flexible rods and substantially from the first end of each flexible rod to the second end of each flexible rod. The sheet of material may include a solar cell fabric portion **72** to permit the production of electrical energy on a sunlit day including a barrel connector **77** or USB **132**. A lighting system including a plurality of lights **134** may be disposed on the canopy **16** which light may be powered by an alternative power source such as battery **138** which battery may be recharged by the solar cell fabric portion **72**. The flexible rods are constructed or configured so as to bias the rods away from each other providing an effective amount of tension for maintaining the sheet of material stretched out disposition. Wherein, the upright support post is adjustable in height using apertures **50** and a pin **52** and is rotatable in a 360 degree arc. Also, shown is a cross member **24** having first and second ends extending underneath the sheet of material **16** having the first end of the cross member connected to the first flexible rod and the second end of the cross member connected to the second flexible rod at **26**. Wherein the first end **32** of each flexible rod **18**, **20** is frictionally held in the plurality of apertures **34**, **36**, **38**, **40** substantially perpendicular to the upper end of the upright support post **14**. The angle formed between the rods **18**, **20** (expected to be about 30 to 120 degrees) with respect to each other is effectively sized so that the rods become bowed enough to provide enough lateral tension to support the canopy **16** in a stretched out disposition. FIGS. **13**, **14** illustrate embodiments of the present invention **10** wherein pedals **162** or **180** are driven by the user **60** so as to generate additional electricity using generator **148**, **194** for various uses such as charging a battery **150** or driving electric motor **176** and for propelling a kayak **146** by either a propeller **168** or flappers **184**, **186**.

Direction arrows are sometimes placed on the figures of this specification Indicate movement of the various parts and structures of the present invention **10**.

We claim:

1. A watercraft having a canopy, comprising:

a) an upright support post having upper and lower ends, said lower end configured for being supported on said watercraft;

b) first and second flexible rods, each flexible rod having first and second ends;

c) said first end of each said flexible rod disposed on said upper end of said upright support post, wherein said flexible rods are substantially horizontally disposed;

d) a sheet of material having a first edge removably attached to said first flexible rod and a second edge removably attached to said second flexible rod so that said sheet of material forms a canopy extending between said first and second flexible rods and substantially from said first end of each said flexible rod to said second end of each said flexible rod;

e) a solar cell fabric portion disposed on said sheet of material to permit production of electrical energy;

f) a propulsion system for propelling said watercraft, said propulsion system including a pedal system operated by a legs of a user;

g) an electrical generator configured to be operated by said pedal system;

h) a lighting system disposed on said canopy;

i) wherein said lighting system is adapted to receive electrical energy from said solar cell fabric portion; and

j) wherein said lighting system is adapted to receive electrical energy from said electrical generator.

2. The watercraft of claim **1**, further comprising a battery disposed in said watercraft, wherein, said battery can be recharged from said solar cell fabric portion and from said generator.

3. The watercraft of claim **2** wherein said propulsion system is selected from the group consisting of a propeller drive and a flapper drive.

4. The watercraft of claim **3**, further comprising an electrical connector disposed on said solar cell fabric portion.

5. The watercraft of claim **4**, wherein said electrical connector is selected from the group consisting of a barrel connector, a cigar socket, and a universal serial bus.

6. A method for assembling a watercraft having a canopy, comprising the steps of:

a) mounting an upright support post having upper and lower ends on the watercraft:

b) providing first and second flexible rods, each flexible rod haying first and second ends;

c) mounting the first end of each flexible rod on the upper end of the upright support post so that the flexible rods are substantially horizontally disposed;

d) removably attaching a first edge of a sheet of material to the first flexible rod and removably attaching a second edge of the sheet of material to the second flexible rod so that the sheet of material forms a canopy extending between the first and second flexible rods and substantially front the first end of each flexible rod to the second end of each flexible rod;

e) disposing solar cell fabric portion on the sheet of material to permit production of electrical energy;

f) providing a propulsion system for propelling the watercraft, the propulsion system including a pedal system operated by a legs of a user;

g) operatively connecting an electrical generator to the pedal system;

h) disposing a lighting system on the canopy;

i) adapting the lighting system to receive electrical energy from the solar cell fabric portion; and

j) adapting the lighting system to receive electrical energy from the electrical generator.

7. The method of claim **6**, further comprising the step of providing a battery in the watercraft, wherein the battery can be recharged from the solar cell fabric portion and from the generator.

8. The method of claim **6**, wherein the propulsion system is selected from the group consisting of a propeller drive and a flapper drive.

9. The method of claim **8**, further comprising the step of providing an electrical connector on the solar cell fabric portion.

10. The method of claim **9**, wherein the electrical connector is selected from the group consisting of a barrel connector, a cigar socket, and a universal serial bus.

11. The method of claim **6**, further comprising the step of providing an electrical system adapted to receive electrical energy from the solar cell fabric portion and the electrical generator.

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